ARTIFICIAL INTELLIGENCE

(CSC 462)

ASSIGNMENT # 3

NAME: MUAAZ BIN MUKHTAR

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CLASS & SECTION: BSSE-5A

SUBMITTED TO: SIR WAQAS ALI

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Department of Computer Science

QUESTION 1

You are an intelligence analyst working for a national security agency. Your task is to identify potential spies based on intercepted communications and suspicious activities. You have collected the following information:

1. **Logic Statements:**

   i. Suspected spies often communicate through coded messages.

   ii. If a person communicates using a cipher, then they might be involved in espionage.

   iii. All individuals involved in espionage are trained in covert communication techniques.

   iv. Anyone trained in covert communication techniques is not necessarily involved in espionage.

   v. Not all individuals involved in espionage use ciphers for communication.

   vi. Some individuals involved in espionage might not be detected through intercepted communications.

   vii. Persons involved in espionage activities often engage in suspicious behaviors, such as frequent international travel and encrypted file transfers.

2. **Query:** Determine if a person who frequently travels internationally, engages in encrypted file transfers, but doesn't use ciphers in communication, is likely involved in espionage.

Answer:

Let's analyze the information and apply the logic statements to determine the likelihood of the person being involved in espionage based on the given criteria:

1. Suspected spies often communicate through coded messages.
   - This suggests that coded messages, or ciphers, are a common method of communication for spies.
2. If a person communicates using a cipher, then they might be involved in espionage.
   - This implies that using ciphers could be an indicator of involvement in espionage.
3. All individuals involved in espionage are trained in covert communication techniques.
   - This establishes a connection between espionage and training in covert communication techniques.
4. Anyone trained in covert communication techniques is not necessarily involved in espionage.

- This statement suggests that while training in covert communication is a factor, it alone does not confirm espionage involvement.

5. Not all individuals involved in espionage use ciphers for communication.
    - This statement indicates that there are alternative communication methods used by individuals involved in espionage.
6. Some individuals involved in espionage might not be detected through intercepted communications.
    - This implies that not all espionage activities may be revealed through intercepted communications alone.
7. Persons involved in espionage activities often engage in suspicious behaviors, such as frequent international travel and encrypted file transfers.
    - This statement lists specific suspicious behaviors associated with espionage activities.

Now, let's apply this information to the query:

The person in question frequently travels internationally, engages in encrypted file transfers, but doesn't use ciphers in communication. According to the provided logic statements:

- While the person doesn't use ciphers in communication, the use of encrypted file transfers aligns with the behavior associated with espionage.
- The fact that not all individuals involved in espionage use ciphers suggests that their lack of cipher use doesn't rule out the possibility of espionage involvement.
- The statement that some individuals involved in espionage might not be detected through intercepted communications further supports the idea that reliance solely on intercepted communications may not be sufficient to determine espionage involvement.

Based on the information and logic provided, there is a possibility that the person in question may be involved in espionage, especially considering the international travel and encrypted file transfers.

Question No. 2:

In the below mentioned table there are four prepositions. Prove E, Using the Rules of Inference. Make a table properly and write all the applied rule names.

1	$\sim A \wedge B$
2	$C \rightarrow A$
3	$\sim C \rightarrow D$
4	$D \rightarrow E$

Answer:

#	Statement	Reason
1	~A ∧ B	Premises
2	C → A	Premises
3	~C → D	Premises
4	D → E	Premises
5	~A	Simplification 1
6	B	Simplification 1
7	A	Modus Ponens 2 &5
8	~C	Modus Ponens 3 & 7
9	D	Modus Ponens 4 & 8
10	E	Modus Ponens 9 & 4